POST COVID-19 CONDITION

OCSO BIWEEKLY SCAN OF EVIDENCE #18

February 26 - March 11, 2022

- (REMINDER) OCSO is seeking feedback on the scan to inform its development. Please complete this short poll here.

SCOPE

This biweekly update presents an analysis of new evidence, guidance and issues related to post COVID-19 condition (commonly referred to as 'long COVID') and synthesizes the current state of knowledge. Comprehensive lists of details and resources on this issue are available at the Office of the Chief Science Officer.

CURRENT STATE OF KNOWLEDGE

The typical duration of acute COVID-19 illness is two to four weeks. However, some patients have described debilitating symptoms persisting or recurring for weeks or months after acute illness. The range of symptoms reported is broad, and can vary from mild to more severe and debilitating effects that can affect both young and older individuals, regardless of the severity of their initial COVID-19 symptoms in the acute stage. These symptoms are often described as, Post COVID-19 condition (WHO terminology), post-acute sequelae of SARS-CoV-2 infection (PASC), and long COVID (used by patient groups). Affected individuals are commonly referred to as COVID-19 long-haulers. While scientific knowledge on these conditions is building, there is still much that is unknown about this condition. There have been reports of more than 100 symptoms or difficulties with everyday activities.

There is limited data suggesting that the condition may be more likely to develop in those:

- who were hospitalized during acute infection;
- had more than 5 COVID symptoms during the acute phase;
- have pre-existing respiratory disease;
- are older;
- are women; and
- have other co-morbidities or have higher BMI.

Typical therapeutic itinerary involves consultations with multiple specialists and puts emphasis on self-management (rest & relaxation, self-pacing, etc). Emerging evidence points to the importance of multidisciplinary care given the heterogeneity of symptoms associated with Post COVID-19 condition. Multidisciplinary teams in "long COVID" clinics have been set to include professionals from the following fields: rehabilitation, respiratory and cardiac consultants, physiotherapists, occupational therapists, psychologists, etc.

It is anticipated that Post COVID-19 condition will have medium and long-term impact on public health in Canada. Further research with an equity lens on the predisposing conditions and risk factors is needed. Based on research to date, and reviewed by the Public Health Agency of Canada as part of a living systematic review, 56% of individuals who have had COVID-19 reported the presence of one or more symptoms 12 weeks after diagnosis. About 58% of children had 1 or more symptoms 4 weeks or more after their initial COVID-19 infection. Post COVID-19 condition will have implications for the economy, as well as federal programs including disability benefits, employment related measures and sick pay, among others. It is reported that 10% of adults are unable to return to work in the long term. The WHO has said that about one in 4 people infected with COVID-19 have experienced a post-COVID-19 condition for at least 1 month. One in 10 people experience symptoms lasting beyond 12 weeks.

This week's scan includes a scoping review on the management of long COVID in general practice (GP), as well as data from the UK highlighting the prevalence of self-reported long COVID was greatest in people aged 35 to 49 years, females, people living in more deprived areas, those working in teaching and education, social care or health care, and those with another activity-limiting health condition or disability.

GUIDELINES OR STANDARDS

- The **WHO** has developed a clinical case definition of post COVID-19 condition by Delphi methodology that includes 12 domains, available for use in all settings. This first version was developed by patients, researchers and others with the understanding that the definition may change as new evidence emerges and our understanding of the consequences of COVID-19 continues to evolve.
    - "*Post COVID-19 condition occurs in individuals with a history of probable or confirmed SARS CoV-2 infection, usually 3 months from the onset of COVID-19 with symptoms and that last for at least 2 months and cannot be explained by an alternative diagnosis. Common symptoms include fatigue, shortness of breath, cognitive dysfunction but also others and generally have an impact on everyday functioning. Symptoms may be new onset following initial recovery from an acute COVID-19 episode or persist from the initial illness. Symptoms may also fluctuate or relapse over time.*"
    - **WHO:** Q&A page on Post-COVID-19 Condition (February 2022).

- The **US CDC** describes Post-COVID conditions as a range of new, returning, or ongoing health problems people experience four or more weeks after first being infected with the virus that causes COVID-19. The CDC highlights the various types of post-COVID conditions such as: Multiorgan Effects of COVID-19, Effects of COVID-19 Illness or Hospitalization, and 'New or Ongoing Symptoms'. The CDC posted Interim Guidance for healthcare providers on Evaluating and Caring for Patients with Post-COVID Conditions. Post-COVID conditions can be considered a disability under the Americans with Disabilities Act (ADA). The CDC also released information on Caring for People with Post-COVID Conditions.

- Rapid guidelines for healthcare professionals by UK **NICE** (Updated November 2021).

- **Chartered Society of Physiotherapy** in UK published its COVID-19 rehabilitation standards, which includes guidance about community-based rehab for people with COVID-19 and long COVID (July 2021).

- Guidelines to help doctors manage long COVID patients published in *British Journal of General Practice* (August 2021).

- UK **NHS** guidance for Post-COVID syndrome assessment clinics (April 2021).

- **CIHI** guidance for clinicians to ensure that data supports monitoring for Post-COVID conditions.

- Guidance for **Canadian Rehabilitation and Exercise Professionals** on Post COVID-19 condition and rehabilitation management strategies (August 2021).

- **Government of Canada**: COVID-19 for health professionals - Post COVID-19 condition

- **Center for Effective Practice** – COVID-19: Clinical Guidance for Primary Care Providers - Long-term symptoms / Post-acute sequelae of COVID-19 (PASC)

- Guideline S1: Long COVID: Diagnostics and treatment strategies (*Wiener klinische Wochenschrift*)

- American Academy of Physical Medicine and Rehabilitation (**AAPM&R**): Cognitive Symptoms Guidance and Breathing Discomfort Guidance.

- Royal Australian College of General Practitioners (**RACGP**) guidance for GPs caring for 'long COVID' patients.

- A paper by Stephenson et al. published in BMJ's *Archives of Disease in Childhood* has produced a consensus on a definition of **long COVID in children**:
    - *"Post-COVID-19 condition occurs in young people with a history of confirmed SARS CoV2 infection, with one or more persisting physical symptom for a minimum duration of 12 weeks after initial testing that cannot be explained by an alternative diagnosis. The symptoms have an impact on everyday functioning, may continue or develop after COVID-19 infection, and may fluctuate or relapse over time."*

- European Society of Clinical Microbiology and Infectious Diseases (**ESCMID**): Rapid guidelines for assessment and management of long COVID

NATIONAL AND INTERNATIONAL DEVELOPMENTS (*FEB 26-MAR 11*)

CANADA

- (NEW) A study surveyed Quebec health-care workers infected with COVID-19 in first 3 waves of pandemic, between July 2020 and May 2021, and were not hospitalized. A sample of symptomatic health workers with a negative PCR test result served as control group. Researchers found among 6,000 workers who responded and were positive, 46% still had at least one post-COVID condition after 4 weeks and 40% had at least one symptom after 3 months.
- (NEW) Statement from Canada's Minister of Health (March 11): "Today, on the second National Day of Observance for COVID-19, we take time to mourn the people we lost, as well as recognize those who got sick, and those who are still suffering from long COVID-19. This is also the day where we recognize and show gratitude to our health care workers who sacrificed so much, and spent two years on the front lines to protect us all. "
- (UPDATED) Outpatient Rehabilitation Programs in Ontario for those with ongoing COVID-19 symptoms.

UK

- (UPDATED) 90 long COVID assessment centres have been set up across England. Similar clinics have opened in Northern Ireland, while in Scotland and Wales patients are referred to different services, depending on their specific symptoms.
- (NEW) According to the UK Office of National Statistics (March 3), long-COVID symptoms adversely affected the day-to-day activities of 989,000 people (65% of those with self-reported long COVID), with 18% reporting that their ability to undertake their day-to-day activities had been "limited a lot". Prevalence of self-reported long COVID was greatest in people aged 35 to 49 years, females, people living in more deprived areas, those working in teaching and education, social care or health care (likely reflecting increased exposure to COVID-19 infection in these sectors), and those with another activity-limiting health condition or disability.

US

- (NEW) A consortium of six sites in the Boston area will recruit participants as part of a nationwide study of the long-term effects and prolonged symptoms of COVID-19. Together, the sites will recruit 909 participants over the next year to be part of the greater Boston COVID Recovery Cohort (BCRC). Participants will be followed for the next three years. As part of the NIH "Researching COVID to Enhance Recovery" (RECOVER) Initiative, the cohort will help researchers to better understand and define the constellation of long-term complications that can occur after infection and lay the groundwork for preventing and treating symptoms.

EMERGING SCIENTIFIC EVIDENCE (*FEB 26-MAR 11*)

EVIDENCE PRODUCTS

TITLE AND AUTHOR	EVIDENCE TYPE	SUMMARY
Long COVID in Children and Adolescents (Fainardi et al)	Narrative Review (Available in *Life*)	In children, data on long COVID are scant. Reports are conflicting regarding its prevalence, duration and impact on daily life. This narrative review explored the latest literature regarding long COVID-19 in the pediatric population. We showed that long COVID in children might be a relevant clinical problem. In most cases, the prognosis is good, but some children may develop long-term symptoms with a significant impact on their daily life. The paucity of studies on long COVID, including a control group of children not infected by SARS-CoV-2, prevents us from drawing

		firm conclusions. Whether the neuropsychiatric symptoms widely observed in children and adolescents with long COVID are the consequence of SARS-CoV-2 infection or are due to the tremendous stress resulting from the restrictions and the pandemics is still not clear. In both cases, psychological support can play a fundamental role in managing COVID pandemics in children. More knowledge is needed to share a standardized definition of the syndrome and improve its management and treatment.
The Challenge of Studying Long COVID: An Updated Review (Zimmermann et al)	Review (Available in *Pediatr Infect Dis J)*	Accurately determining the risk of long COVID is challenging. Existing studies in children and adolescents have considerable limitations and distinguishing long-term SARS-CoV-2 infection-associated symptoms from pandemic-related symptoms is difficult. Over half of individuals in this age group, irrespective of COVID-19, report physical and psychological symptoms, highlighting the impact of the pandemic. More robust data is needed to inform policy decisions.
Post-COVID-19 Syndrome (Pierce et al)	Review (Available in *Nurs Res*)	Findings from review indicated that there were four pathophysiological categories involved: virus-specific pathophysiological variations, oxidative stress, immunologic abnormalities, and inflammatory damage. Although studies examining the pathophysiology of post-COVID-19 syndrome are still relatively few, there is growing evidence that this is a complex and multifactorial syndrome involving virus-specific pathophysiological variations that affect many mechanisms but specifically oxidative stress, immune function, and inflammation. Further research is needed to elucidate the pathophysiology, pathogenesis, and longer term consequences involved in post-COVID-19 syndrome.
Enhancing the management of long COVID in general practice: a scoping review (Brennan et al)	Scoping Review (Available in *BJGP Open*)	Findings show that GPs can and have played a key role in the management of Long COVID, and that patient care can be improved through better understanding of patient experiences, standardised approaches for symptom identification/treatment, and facilitation of access to multidisciplinary specialist services when needed. Future research evaluating focused GP interventions is needed.
A systematic review and meta-analysis of Long COVID symptoms (Natarajan et al)	Systematic Review (Available in *medRxiv*)	Systematic review included publications from December 2019 to June 2021. Multiple electronic databases were used. The quality that differentiates this meta analysis is that they are cohort and cross-sectional studies with follow up. It is evident that there is limited knowledge available of long COVID and current clinical management strategies may be suboptimal as a result. Clinical practice improvements will require more comprehensive clinical research, enabling effective evidence-based approaches to better support patients.

SELECT PRIMARY RESEARCH

TITLE AND AUTHOR	SOURCE	SUMMARY
Risk of Long Covid in people infected with SARS-CoV-2 after two doses of a COVID-19 vaccine: community-based, matched cohort study (Ayoubkhani et al)	*medRxiv*	Study examined whether likelihood of symptoms 12 weeks after infection differed by vaccination status. Included COVID-19 Infection Survey participants aged 18-69 years who tested positive for SARS-CoV-2 between 26 April 2020 and 30 November 2021; excluded participants who, before their first test-confirmed infection, had suspected COVID-19 or Long Covid symptoms, or were single-vaccinated. Study sample comprised 3,090 double-vaccinated participants and matched control participants. COVID-19 vaccination is associated with reduced risk of Long

		Covid, emphasising the need for public health initiatives to increase population-level vaccine uptake. Longer follow-up is needed, as is the assessment of further vaccine doses and Omicron variant.
Excess risk and clusters of symptoms after COVID-19 in a large Norwegian cohort (Caspersen et al)	*Eur J Epidemiol*	Study aimed to calculate excess risk and identify patterns of 22 symptoms up to 12 months after COVID-19 in more than 70,000 adult participants in an ongoing cohort study. One year after infection, 13 of 22 symptoms were associated with SARS-CoV-2 infection. For instance, 17.4% of SARS-CoV-2 infected cohort participants reported fatigue that persist 12 months after infection, compared to new occurrence of fatigue that had lasted less than 12 months in 3.8% of non-infected subjects. Two main underlying factors explained 50% of the variance in the 13 symptoms. Brain fog, poor memory, dizziness, heart palpitations, and fatigue had high loadings on the first factor, while shortness-of breath and cough had high loadings on the second factor. Lack of taste and smell showed low to moderate correlation to other symptoms. Anxiety, depression and mood swings were not strongly related to COVID-19.
Examining Association of Personality Characteristics and Neuropsychiatric Symptoms in Post-COVID Syndrome (Delgado-Alonso et al)	*Brain Sci*	Study aimed to evaluate personality traits in patients with post-COVID syndrome, as well as the association with neuropsychiatric symptoms present in this disorder. Patients with post-COVID syndrome scored lower for emotional stability, equanimity, positive mood, and self-control. Extraversion, emotional stability, and openness correlated negatively with anxiety and depression levels.
The Impact of Long COVID-19 on Mental Health: Observational 6-Month Follow-Up Study (Houben-Wilke et al)	*JMIR Ment Health*	Longitudinal, observational study aimed to reveal symptoms of posttraumatic stress disorder (PTSD) and symptoms of anxiety and depression up to 6 months after onset of COVID-19-related symptoms in patients with confirmed COVID-19 and persistent complaints. At 3-month follow-up, 37.2% patients had symptoms of PTSD, 35.6% had symptoms of anxiety, and 46.9% had symptoms of depression, which remained high at the 6-month follow-up. TSQ scores and HADS anxiety and depression scores were strongly correlated at the 3- and 6-month follow-ups.
Outpatient Pulmonary Rehabilitation in Patients with Long COVID Improves Exercise Capacity, Functional Status, Dyspnea, Fatigue, and Quality of Life (Nopp et al)	*Respiration*	Prospective observational cohort study including consecutive patients admitted to an outpatient pulmonary rehabilitation center due to persistent symptoms after COVID-19. In patients with long COVID, exercise capacity, functional status, dyspnea, fatigue, and quality of life improved after 6 weeks of personalized interdisciplinary pulmonary rehabilitation.
Reassessment of persistent symptoms, self-reported COVID-19 infection and SARS-CoV-2 serology in the SAPRIS-SERO cohort: identifying possible sub-syndromes of Long Covid (Spiers et al)	*medRxiv*	Secondary analysis was used to describe the pattern of persistent symptoms by IgG seropositivity and self reported Long Covid in the SAPRIS-SERO survey. Participants in cross-sectional analysis were 26,823 individuals in France who took part in nested SAPRIS and SAPRIS-SERO surveys. Between May-November 2020, immunosorbent assays were used to detect anti SARS CoV 2 antibodies. Surveyed online between December 2020-January 2021, participants self reported previous COVID-19 infection and physical symptoms during the previous four weeks that were new since March 2020, and had persisted for at least eight weeks. Results showed that there may be three common subsyndromes of Long Covid, one with persistent anosmia, another with other respiratory tract symptoms and a third with symptoms relatable to chronic fatigue. Seropositivity for IgG antibodies did not predict symptoms independently of self reported Long Covid, except for anosmia.

Post-acute symptoms, new onset diagnoses and health problems 6 to 12 months after SARS-CoV-2 infection: a nationwide questionnaire study in the adult Danish population (Sørensen et al)	*medRxiv*	Nationwide cross-sectional study including 152 880 individuals with the data collected 6, 9 or 12 months after positive test. Six to twelve months after test date, risks of 18 out of 21 physical symptoms were elevated among test-positives and one third of the test-positives experienced at least one physical post-acute symptom. The largest risk differences were observed for dysosmia, dysgeusia, fatigue/exhaustion, dyspnea and reduced strength in arms/legs.
Risk factors and severity of functional impairment in long COVID: a single-center experience in Croatia (Banić et al)	*Croat Med J*	Aim of study was to determine the frequency of common symptoms in long COVID and their effect on the quality of life, and to determine the factors contributing to a more severe long COVID. Final sample consisted of 261 patients. After acute COVID-19 period (>4 weeks), almost 80% had impaired functional status. 21.5% reported no functional impairment. A higher Post Covid Functional Status (PCFS) score was associated with female sex and oxygen therapy requirement during acute disease. It was not associated with having a pre-existing lung disease. Disease severity did not pose a risk for developing more severe long COVID.
On the single and multiple associations of COVID-19 post-acute sequelae: 6-month prospective cohort study (Jiménez-Rodríguez et al)	*Sci Rep*	Conducted a cohort study from May to October 2020 to analyze single and multiple associations between post-COVID-19 characteristics with up to 6-months of follow-up in hospitalized and non-hospitalized COVID-19 patients at the University Hospital Virgen de la Nieves in Granada, Spain. Post-COVID-19 clinical and mental health impairment symptoms are correlated with patient gender. Functional lung tests are good predictors of chest CT imaging abnormalities in elderly patients. Non-hospitalized patients suffer more severe thromboembolic events and fatigue than those hospitalized.
Peripheral Neuropathy Evaluations of Patients With Prolonged Long COVID (Oaklander et al)	*Neurol Neuroimmunol Neuroinflamm*	Study analyzed cross-sectional and longitudinal data from patients with World Health Organization (WHO)-defined long COVID without prior neuropathy history or risks who were referred for peripheral neuropathy evaluations. Among 17 patients (mean age 43.3 years, 69% female, 94% Caucasian, and 19% Latino), 59% had ≥1 test interpretation confirming neuropathy. These included 63% (10/16) of skin biopsies, 17% (2/12) of electrodiagnostic tests and 50% (4/8) of autonomic function tests. One patient was diagnosed with critical illness axonal neuropathy and another with multifocal demyelinating neuropathy 3 weeks after mild COVID, and ≥10 received small-fiber neuropathy diagnoses. Longitudinal improvement averaged 52%, although none reported complete resolution. For treatment, 65% (11/17) received immunotherapies (corticosteroids and/or IV immunoglobulins).
Long COVID in hospitalized and non-hospitalized patients in a large cohort in Northwest Spain, a prospective cohort study (Pérez-González et al)	*Sci Rep*	Aim of this study was to describe persisting symptoms 6 months after COVID-19 diagnosis in a prospective cohort in the Northwest Spain (n = 248). At 6 months, 48% patients described one or more persisting symptoms. The most prevalent were: extra-thoracic symptoms (39.1%), chest symptoms (27%), dyspnoea (20.6%), and fatigue (16.1%). These symptoms were more common in hospitalized patients (52.3% vs. 38.2%) and in women (59.0% vs. 40.5%). The multivariate analysis identified COPD, women gender and tobacco consumption as risk factors for long COVID. Persisting symptoms are common after COVID-19 especially in hospitalized patients compared to outpatients (52.3% vs. 38.2%).
Serial Changes of Long COVID Symptoms and Clinical Utility of Serum	*J Clin Med*	To determine the key factors that affect the onset and clinical course of longterm sequelae of COVID, a retrospective analysis was performed at Okayama University Hospital (Japan) between February and July 2021.

Antibody Titers for Evaluation of Long COVID (Sakurada et al)		The symptoms of sequelae were diverse, with more than 20 types. The most frequent symptoms were general malaise, dysosmia, dysgeusia, sleeplessness, and headache. These symptoms improved in about 60% of the patients after 3 months. Patients who required hospitalization and had a poor condition in the acute phase and patients who received oxygen/dexamethasone therapy had higher antibody titers at the time of consultation.
Relationship between changes in symptoms and antibody titers after a single vaccination in patients with Long COVID (Tsuchida et al)	*J Med Virol*	Study evaluated post-vaccination changes in symptoms and antibody titers in patients with Long COVID. Post-vaccination symptoms (fatigue, joint pain, and taste and olfactory abnormalities) were relieved, worsened, and unchanged in 7, 9, and 26 patients, respectively. Ratios of pre- and post-vaccination antibody titers were 53, 40, and 174 in the unchanged, relief, and worsened groups, respectively. Worsened group had significantly highest antibody titer ratio.
Persisting Symptoms After COVID-19-Prevalence and Risk Factors in a Population-Based Cohort (Förster et al)	*Dtsch Arztebl Int*	Using a population-based approach, study reports symptoms and clinical characteristics following COVID-19 (long COVID), focusing on symptoms ≥12 weeks (post-COVID-19). Prevalence of post-COVID-19 was 72.6% (n = 127) and 46.2% (n = 588) for hospitalized and non-hospitalized patients, respectively. The most frequent long-term symptoms were fatigue (41.5% of all symptoms ≥12 weeks, n = 297), physical exhaustion (40.8%, n = 292), difficulty in concentrating (30.6%, n = 219), ageusia (25.9%, n = 185), and anosmia (25.5%, n = 182). Quality of life was significantly impaired in patients with post-COVID-19. The strongest risk factors for post-COVID-19 were female sex, overall severity of comorbidities, and severity of acute COVID-19.
Post-COVID-19 syndrome. SARS-CoV-2 RNA detection in plasma, stool, and urine in patients with persistent symptoms after COVID-19 (Tejerina et al)	*BMC Infect Dis*	Study describes a cohort of patients with a constellation of symptoms occurring four weeks after COVID-19 diagnosis causing different degrees of reduced functional capacity. Evaluated 29 patients who reported fatigue, muscle pain, dyspnea, inappropriate tachycardia, and low-grade fever. Previous COVID-19 was mild in 55% of the cases. 45% patients had positive plasma RT-PCR results and 51% were positive in at least one RT-PCR sample (plasma, urine, or stool). Functional status was severely reduced in 48% of the subjects. 62% received antiviral treatment. Improvement was seen in most patients and patients in the treatment group achieved better outcomes with significant differences.
Experiences of workers with post-COVID-19 symptoms can signpost suitable workplace accommodations (Lunt et al)	*Int J Workplace Health Manag*	Study was undertaken to provide empirical evidence of the work-relevant experiences of workers recovering from COVID-19. Participants mainly from health/social care (50%) and educational settings (14%). Over 90% indicated that they had experienced at least some post-COVID-19 symptoms, notably fatigue and cognitive effects. For 55%, symptoms lasted longer than six months. Only 15% had managed a full return-to-work. Of 88 who provided workability ratings, 13 and 18% respectively rated physical and mental workability as good or very good. Difficulties in resuming work were attributed to symptom unpredictability, their interaction with job demands, managing symptoms and demands in parallel, unhelpful attitudes and expectations.
Impact of COVID-19 symptoms on social aspects of life among female long haulers: A qualitative study (Aghaei et al)	*Res Sq*	Study aims to explore impacts of long COVID on various aspects of social life among female long haulers. Conducted 15 semi-structured interviews with female long haulers in the United States purposely recruited from Facebook groups, Slack group, and organization websites. Participants reported persistent symptoms that negatively affected their social lives in many ways. Main impacts included physical limitation, financial hardship,

		social relationship, conflict of social roles, and social stigma. Negative effects of long COVID hindered female long haulers' recovery process. Social isolation, COVID-19 associated stigma, and conflicts of social roles cause tremendous stress. Employers' support and social media usage may play positive role in coping with impacts of long COVID on their social life.
Characteristics and impact of Long Covid: Findings from an online survey (Ziauddeen et al)	*PLoS One*	Study aimed to explore initial and ongoing symptoms of Long Covid following SARS-CoV-2 infection and describe its impact on daily life by self-reported data through an online survey. We analysed data from 2550 participants with a median duration of illness of 7.6 months (interquartile range (IQR) 7.1-7.9). 26.5% reported lab-confirmation of infection. The most common initial symptoms that persisted were exhaustion, chest pressure/tightness, shortness of breath and headache. Cognitive dysfunction and palpitations became more prevalent later in the illness. Most participants described fluctuating (57.7%) or relapsing symptoms (17.6%).

COMMENTARIES, LETTERS AND OPINION PIECES (*FEB 26-MAR 11*)

- Toward Unbiased Evaluation of Postacute Sequelae of SARS-CoV-2 Infection: Challenges and Solutions for the Long Haul Ahead (*Ann Intern Med*): Early reporting of post-acute SARS-CoV-2 syndrome (PASC) foretells a difficult challenge developing in parallel to the ongoing pandemic. Some patients with prior acute COVID-19 report multiple new or persistent symptoms affecting nearly every organ system. In the United States, PASC has already been approved for inclusion and protections within the Americans with Disabilities Act despite limited study data or medical consensus. Yet, we do not know what constitutes long COVID or how to formally diagnose it. An improved understanding of this condition is needed to provide appropriate care for our patients. However, developing high-quality scientific evidence on PASC presents a unique challenge due to the evolving circumstances of SARS-CoV-2 and the pandemic itself. Such work will indeed be a long haul. Inherent sources of potential bias in studying this new phenomenon require that the medical community understand both study design and study limitations when generating, publishing, and using reports.

- Long COVID: sustained and multiplied disadvantage *(Med J Aust):* From an equity perspective, the over-representation of chronic conditions among disadvantaged (and often racialised) populations (eg, Indigenous Australians) increases the risk of both COVID-19 acute severity and long COVID. People with long COVID have reported significant stigma, difficulties in accessing services and returning to full time work, trouble maintaining important relationships and life roles, and barriers to engaging in activities of daily living. Australian data confirm this. The infection risk for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is associated with age, immune status, and certain pre-existing non-communicable diseases such as obesity, asthma etc. One of the few predictive models available for long COVID has found associations with age, body mass index, female sex and the number of symptoms experienced within the first 7 days of infection. Each of these factors is already profoundly driven by the social determinants of health and health inequity. The enduring effects of long COVID in groups that already experience disadvantage and inequality will make livelihoods more perilous.

MEDIA HIGHLIGHTS (*FEB 26-MAR 11*)

CANADA

- **Two years after the start of the pandemic, many with long COVID suffer alone (CTV News):** Dr. Thao Huynh, an epidemiologist and cardiologist at the McGill University Health Centre (MUHC), is leading one of the first major studies on long COVID in Quebec. She explains that though symptoms can worsen for some patients after getting vaccinated, it's actually a good sign that the body is recognizing and fighting the virus. Huynh explains because there is such limited research about long COVID, many doctors don't have the tools to help their patients -- going so far as to make them feel like they're being dismissed or overreacting.

GLOBAL

- **Long Covid patients, in search of relief, turn to private company (NBC News):** The main premise of IncellDx, a private California-based company, is a diagnostic blood test which the company claims can diagnose long Covid, help determine effective therapies and show any improvements after treatment. IncellDx does not do blood draws; instead, patients must send a blood sample to the company for analysis. The test looks at levels of 14 immune system proteins called cytokines that the company says indicate the blood vessel inflammation specific to long Covid. Critics counter that there are no simple blood tests or widely accepted biomarkers to determine whether someone has long Covid.
- **The Pandemic After the Pandemic (The Atlantic):** Long COVID is written into CDC and WHO documents; it makes a cameo in the newest version of President Joe Biden's National COVID-19 Preparedness Plan. Too many studies have "inadvertently included COVID-infected people in their negative control groups" because they rely on fallible tests that can't adequately determine who's actually caught the virus. Even after much of the world puts the pandemic in its rearview, long COVID will keep filling hospitals and clinics.

POST COVID-19 CONDITION RESOURCES

- (NEWLY ADDED) Post-COVID-19 Functional Status Scale: An overview of a patient self-reported scale that helps to support assessment of functional status and recovery after the SARS-CoV-2 infection.
- (NEWLY ADDED) Ontario College of Family Physicians: Resources on Post-COVID Condition.
- Agency for Clinical Innovation (Australia): Living Evidence - post acute sequelae of COVID-19.
- Pre-populated literature searches: Long COVID search (LitCovid) and Long COVID search (NIH)
- PAHO Webinar Series on Post COVID-19 Condition launched 17 February, 2022, from 10:30 am to 12:30 pm (EST).
- Body Politic COVID-19 Support Group (Global): Housed on the Slack app, group members have access to dozens of different channels, which give space for more personal discussion. Some of the channels include those specifically for medical professionals, parents of children with Covid-19, LGBTQ+ individuals, BIPOC+, and different regions around the world.
- Patient-Led Research Collaborative (Global): Self-organized group of Long COVID patients working on patient-led research around the Long COVID experience.
- British Heart Foundation (UK): UK-based foundation with resources on long COVID.
- COVID Long Haul (Canada): Canada's largest online platform for COVID survivors, their family members and anyone searching for the most up-to-date information about the pandemic. There is a COVID long-haulers support group and a Report on Pan-Canadian Long COVID Impact Survey (PDF) (June 2021)
- BC ECHO for Post-COVID-19 Recovery (Canada): BC ECHO for Post-COVID-19 Recovery is a learning community of specialists and community health-care providers who use case-based learning to improve care for those recovering from symptoms post-COVID-19.
- Long Covid Support (UK): Peer support and advocacy group aiming to facilitate international peer support and campaigning in the UK for recognition, rehabilitation and research into treatments.

- Long COVID SOS (UK): Long-term sufferers formed the LongCovidSOS campaign to put pressure on the UK government to recognise the needs of those with Long Covid, and to raise awareness among the general public and employers.

- Survivor Corps (US): One of the largest and fastest growing grassroots movements connecting, supporting, and mobilizing COVID-19 Survivors to support research. They have a list of Post-COVID Care Centers (PCC) and a PCCC Best Practices Guide.

- The Center for Chronic Illness (US): Aims to promote well-being and decrease isolation for those impacted by chronic illness through support and education. Their online support groups are professionally-facilitated and offer psychoeducational tools for coping.

- Blooming Magnolia (US): Mission is to empower others by providing a platform to strengthen & protect mental health and support those afflicted with Long-Covid through education and funding of therapeutic research. They have a list of support groups and resources on their website.

- Long COVID Alliance (US): US-based network of patient-advocates, scientists, disease experts, and drug developers who have joined together to leverage their collective knowledge and resources to educate policy makers and accelerate research to transform our understanding of post-viral illness.

- Long COVID Kids (UK/US/Canada): Parent & patient led advocacy & support group based in the UK.

- Long COVID Physio (US & UK): International peer support, education and advocacy group of Physiotherapists living with Long COVID, founded in November 2020 by Physiotherapists living with Long COVID from the UK and US.

- Patient-Led Research Collaborative (Global): Group of Long COVID patients working on patient-led research around the Long COVID experience.

- CANCOV- Patient resources (Canada): CANCOV is a research platform grounded in a prospective longitudinal 1-year cohort study of patients infected with COVID-19.

- COVID Patient Recovery Alliance (CPRA) (US): CPRA aims to bring together leaders in business, health care, research, academia, data and analytics, and patient advocacy to develop solutions that coordinate diverse data sources, inform models of care, and ensure adequate payment for long-COVID patients. Their report outlines recommendations for federal policymakers to promote recovery.

- British Lung Foundation (UK): UK-based charity sharing resources on navigating the NHS, breathlessness support, movement and energy support for long COVID patients.

- Living with Long COVID (US): COVID-19 Long-Haulers and Post-COVID Support Community.

***Note**: Previous OCSO Post COVID-19 Condition Scans can be found here.*